

**Design and Construction of a Green Infrastructure Stormwater BMP
Retrofit for One or More Municipal Properties on Cape Cod
A Demonstration and Education and Outreach Project
Contract #: EP-BPA-13-W-0001**

**Technical Approach, Assumptions, Schedule,
and Guaranteed Maximum Cost Estimate**

Submitted by WaterVision, LLC.

September 15, 2014

Overview

WaterVision's technical approach, assumptions, schedule, and cost estimate for each Performance Work Statement (PWS) task are provided below. The work to be conducted under the PWS will increase practitioner and public awareness of practical stormwater management approaches for treating stormwater to reduce nitrogen loadings on Cape Cod. We understand the importance of demonstrating effective stormwater management for nitrogen on Cape Cod and recognize that this project has the potential to trigger additional GI projects throughout the Cape and the region.

Water Vision Team has extensive experience in conducting each of the tasks specified in the PWS and we are excited to conduct this important project. The PWS contains a series of tasks, beginning with evaluating the feasibility of alternative BMP designs for nitrogen reduction and ending with BMP construction and performance testing. The WaterVision and Comprehensive Environmental Inc. (CEI) team have experience evaluating BMP designs, designing and constructing BMPs, designing and implementing monitoring programs, and conducted education and outreach programs. We understand that it is critically important to customize BMP designs to work well within each specific site and budget. We are fully prepared to adapt our BMP designs to optimize performance at the selected Cape Cod site(s).

Responding to this PWS was challenging because there is a significant uncertainty regarding the details of the BMP design and construction tasks. There are currently two candidate sites and, while both sites have been visited, both sites lack site-specific data and detailed feasibility analysis. As a result, WaterVision is providing our best estimate of the costs associated with designing and constructing a stormwater BMP on each site. To account for uncertainties regarding these sites, we have provided "worst-case" cost estimates, including a 40% contingency for the construction component of each site's cost estimate. We look forward to

providing a detailed and accurate cost estimate for each site BMP, as part of Task 1 (Subtask 1D Contractor Estimation of Project Feasibility).

Importantly, WaterVision specializes in working collaboratively with EPA and municipal staff. We understand that the specific BMP sites, size, and designs for this project have not yet been finalized and that the requirements for the BMP(s) may change. We will communicate clearly and proactively with EPA staff to ensure that BMP design(s) constructed will provide good value and support project goals.

The PWS features six tasks:

- Task 1: Independent Verification of EPA Preliminary Site Selections and Concept Level Design and Opinion of Cost
- Task 2: BMP Design
- Task 3: Construction
- Task 4: Development of Performance Monitoring Program and Infrastructure
- Task 5: Operation and Maintenance (O & M) Plan
- Task 6: Education and Outreach

WaterVision's response to the three PWS tasks is provided below with sets of assumptions and deliverables associated with each task and subtask. We also respectfully submit a revised project schedule for your consideration on page 14 of this response package, followed by a detailed cost estimate.

Task 1: Independent Verification of EPA Preliminary Site Selections and Concept Level Design and Opinion of Cost

Subtask 1A – Literature / Technology Review

WaterVision will conduct a review of relevant and applicable literature on stormwater BMPs for nitrogen. This review will include a variety of methods currently being developed and applied throughout the United States and notably in the Chesapeake Bay, Pacific northwest, and northeast regions. The review will focus on the Tedeschi BMP design and associated data analyses and reports. The literature/technology review is critically important to ensure that the most appropriate BMP method is selected and applied on Cape Cod.

Assumptions:

1. Two WaterVision Team staff will conduct a one-day visit to Durham, New Hampshire to visit the Tedeschi BMP site and meet with UNH Stormwater Center staff.
2. Two WaterVision Team staff will conduct a meeting at EPA, Boston with members of the NERL team and other EPA staff.

Deliverables:

- Literature / technical review summary to be submitted as a section of the Summary Memorandum delivered as part of Task 1D below.

Subtask 1B – Site Visits

WaterVision will conduct a one-day site visit with meetings at each of two potential BMP sites on Cape Cod, as described in the PWS.

Assumptions:

1. Three WaterVision Team staff will participate in a one-day site visit with meetings.
2. The meetings will consist primarily of informal discussions of the project and potential sites and WaterVision will not provide a presentation (e.g., Powerpoint slides).
3. WaterVision will make observations at the two potential sites, but will not collect quantitative data. Data collection and analysis will be conducted as part of Task 1C below.
4. EPA will coordinate with the Municipality(s) to obtain additional available data such as MS4 as-built plans, property information, etc.

Deliverables:

- A brief summary of the site visit and meeting to be submitted as a section of the Summary Memorandum delivered as part of Task 1D below. This brief summary will include key observations obtained at each site and during the meetings, but will not include meeting minutes or detailed documentation.

Subtask 1C – Data Collection and Analysis

We will collect preliminary field data to evaluate potential BMP design and retrofit options prior to initiating detailed BMP design. The following will be performed:

- Obtain and review any available historical topography and utility plans (as available from the Town and obtained by EPA);
- Arrange DigSafe for proposed soils exploration;
- Perform limited preliminary survey in-house to validate potential design options;
- Conduct limited clearing at Chatham site for borings;
- Perform one day of borings per site;
- Complete an abbreviated alternative evaluation of BMP retrofit(s) for advancing toward conceptual and final design;
- Review and confirm previous information developed by the Towns and/or EPA including:
 - Delineation of the estimated contributing drainage areas from topography shown on MassGIS 3-meter contour data layer, supplemented by available design background information;

- Estimate of runoff volumes for the 2, 10, and 100 year storm events, using NRCS TR-55/TR-20 methodology;
- Perform estimate or required or achievable water quality volume (WqV);
- Estimate of available storage volumes using MassGIS topographic data, for comparison to the storm volumes estimated for each design storm noted above.

Assumptions:

1. This data collection and analysis task will be conducted at two sites, Chatham and Barnstable, as described in the PWS.
2. EPA will coordinate with the Municipality(s) to obtain additional available data such as MS4 as-built plans, property information, historical topographic data, etc.
3. EPA/Town provides site access and permission.
4. We will coordinate with the respective Towns to access and perform work on the sites.
5. One two-man crew can perform the preliminary survey and observe borings at the same time (one day at each site).
6. Police details will not be needed for site recon, survey or boring efforts as the properties are accessible from very low traffic volume roads or parking lots.
7. No permit fees associated with boring or survey efforts.

Deliverables

- Relevant site-specific data will be described in the BMP design deliverable (under Task 2)

Subtask 1D – Contractor Estimation of Project Feasibility

WaterVision will write and submit a Summary Memorandum containing the following elements:

- A summary of the literature / technology review conducted as part of Subtask 1A;
- A brief summary of the findings associated with the site visit and meetings conducted as part of Subtask 1B;
- A summary of the data collection and analysis task conducted as part of Subtask 1C;
- A statement of professional engineering opinion of project feasibility for each of two sites;
- Recommendations for design modification to improve performance and/or feasibility at each site (if needed);
- An independent estimation of cost for each of two sites;
- Identification and description of required additional data collection (if needed);

- An assessment of the likelihood for the need of permitting and associated implications of permitting on the schedule, cost, and feasibility of the project;
- Recommendations for seeking in-kind services from the municipality;
- Preliminary assessment of the monitoring program design including potential equipment requirements.

All of the elements described above will be applied for each of the two sites.

Deliverables:

- Draft Summary Memorandum submitted to EPA for review and comment
- Final Summary Memorandum

Subtask 1E – Project Management

Three project management elements are described in the PWS (on page 13; second to last paragraph); weekly status updates, monthly invoices and project summaries, and monthly conference calls (as needed). WaterVision is fully prepared to complete these important tasks and assumes the following.

Assumptions:

1. Two-year project duration;
2. Fifteen minutes for each weekly status update email (26 hours over 2 years)
3. One hour for the project manager and one hour for project administer for each monthly invoice and summary letter (48 hours total for each of two people over 2 years).
4. Two hours for the project manager to prepare for and conduct a monthly project teleconference. It was further assumed that conference calls would be required only one-half of the months; total 12 conference calls (24 hours total).

Deliverables:

- Weekly project status emails;
- Monthly invoices and project summaries;
- 12 teleconferences

Task 2 – BMP Design

The WaterVision Team, led by CEI, will complete design work based on EPA approval of the conceptual BMP(s) assessed under Task 1. We understand that the BMPs will likely utilize design concepts and details similar to the UNH Tedeschi Parking Lot BMP for both sites, as amended by the results of the Task 1 effort.

A full topographic survey of the area, pertinent street surfaces, and key drainage structures will be performed to provide the necessary information for BMP design and to form the AutoCAD base map for BMP design. We will refine the drainage delineation for the selected BMP area and perform calculations to estimate the volume and flow rate of stormwater to be treated by BMPs using standard accepted practices.

We will develop the designs of the selected BMPs including applicable pretreatment components, inlet and outlet structures, connecting piping, overflow devices, and related features. The designs will be prepared with AutoCAD Civil 3D 2013. CEI will develop one drawing /special provision package and estimate for each site.

Draft design(s) will be distributed for review by EPA and other designated stakeholders. Designs will be revised based on review comments and finalized for construction.

Assumptions:

1. One (1) BMP design will be developed for each of two sites.
2. Permitting will be completed by others.
3. EPA/Town will provide site access and permission for topographic survey.
4. There will be no permitting required for acquisition of topographic survey.
5. Topographic survey will be limited to approximately 1/3 acre for the Chatham site and ¼ acre for the Barnstable site.
6. The Town will provide assistance if drainage structures needing to be opened/accessed for survey are inaccessible, full of debris, or unopenable using hand non-powered equipment.
7. Plans and technical specifications will be prepared for the BMP designs to a level appropriate for installation by the Construction Subcontractor and will not be designed to support public bid.

Deliverables:

- Draft BMP Designs and Specifications
- Final BMP Designs and Specifications

Task 3 – Construction

Construction of BMPs will be consistent with the designs developed under Task 2. At this point, we anticipate a worse-case construction schedule of four (4) weeks for installation of the Barnstable BMP and (8) eight weeks for the Chatham BMP. As noted above in the design task, we have assumed construction to be similar in nature to the UNH Tedeschi BMP using similar materials with quantities adjusted to accommodate larger design treatment flows. We have assumed that an inspector (engineering level 1 staff) will be present on site on a full-time basis due to the high-quality and precision construction required for a BMP of this type. Additional staff time for technical assistance, meeting attendance, coordination with stakeholders, QA/QC of construction documentation efforts, etc. is also included.

Assumptions:

1. Site access will be granted by the Owner(s).
2. Permitting will be completed by the Town(s).
3. It is assumed that minimal clearing will be needed at the Barnstable site.
4. It is assumed that invasive species (Japanese Knotweed) identified at the Chatham site will require special excavation and disposal so as not to exacerbate their spread.
5. It is assumed that in order to tie excess stormwater flows back into the existing drainage system located at the Chatham site within Oyster Pond Furlong (which appears to be a 30" to 36" diameter drain line) a new large (6') diameter deep (12'-15') manhole will be needed. Accordingly rental of excavation equipment large enough to excavate for and place this structure as well as trench protection is included as a separate cost line item.
6. Pavement replacement around any new drainage structures located within Town roads or parking lots will be area patch only and not full width/extended length curb to curb paving.
7. Travel costs (other than inspector mileage) includes either paid travel time to compensate labor for travel to and from the construction site or for double occupancy hotel rooms not exceeding \$200 per night.
8. On site inspection services will include 6 hours on site with 2-hour travel time per day.
9. Construction costs are based on similar treatment levels and material/detail to the UNH Tedeschi site. There may be the opportunity to amend the area treated and/or the water quality volume treated at one or both sites. Reduction of the size of the BMP would likely result in reduced construction costs.
10. It is assumed that if both construction projects move forward, one would be constructed in spring 2015 and the second would be constructed in fall 2015

Deliverables:

- Site Construction and Daily Inspection Reports

Task 4: Development of Performance Monitoring Program and Infrastructure

WaterVision will design a monitoring program to measure the nitrogen removal performance of the Cape Cod nitrogen BMP. The monitoring program will be designed to collect physical and chemical data needed to develop a BMP performance curve. WaterVision's response is based on developing a performance monitoring program at one BMP site.

Based on review of the PWS, several subtasks and contingency tasks have been identified as follows.

Subtasks

- Subtask 4A: Initial Monitoring Design Team Meetings
- Subtask 4B: Monitoring Plan
- Subtask 4C: QAPP Review
- Subtask 4D: Monitoring Equipment Installation, Setup, and Testing
- Subtask 4E: Monitoring Equipment and Monitoring Event Training

Contingency Tasks

- Contingency 4A: Purchase of two auto-samplers
- Contingency 4B: Purchase of one in-situ water quality meter
- Contingency 4C: Purchase of equipment shed with electrical service
- Contingency 4D: Data logging laptop computer for monitoring shed

An approach, assumptions, and cost estimates for each of these subtasks and contingencies are provided below.

Subtask 4A – Initial Monitoring Design Team Meetings

WaterVision's collaboration with the NERL Team and the UNH Stormwater Center will be critically important to project success and will be initiated through two meetings conducted early-on in the project. The first meeting will be conducted at the UNH Stormwater Center and will feature discussion of the monitoring design at the Tedeschi BMP site and at the UNH Stormwater Center. This meeting will provide valuable insights and design ideas relative to the Cape Cod BMP application. The second meeting will be conducted at EPA, Boston and will focus on Cape Cod BMP design components, equipment, sampling protocols, and specific data requirements to support performance curve development.

WaterVision will continue to collaborate with the NERL Team and with the UNH Stormwater Center throughout the project. Such collaboration has been built into the approach and budget of the subtasks described below.

Assumptions:

1. Two one-day meetings; one at Durham, NH and one at EPA, Boston
2. 4 hours for initial coordination calls and discussions

Deliverables:

- None

Subtask 4B – Monitoring Plan

WaterVision will develop a draft and final monitoring plan. The monitoring plan will include description of a physical and chemical sampling program, including equipment specifications. The plan will include planning for flow measurement, rainfall measurement (if needed), in-situ water quality (if needed), and chemical data collection for up to 20 storm events per year.

Assumptions:

1. The monitoring plan will be analogous to a field sampling plan. The plan will describe project objectives, conceptual approach, field sampling methods, equipment, sampling locations, and criteria for conducting sampling (e.g. rainfall amounts). The monitoring plan will be designed as a companion to a QAPP and will not contain detail-oriented elements normally found in QAPPs (e.g., DQOs and chemical analysis specifications).
2. The monitoring plan will be for one BMP site only.

Deliverables:

- Draft monitoring plan
- Final monitoring plan

Subtask 4C – QAPP Review

WaterVision will review the draft QAPP and provide suggested edits and comments in redline-strikeout format.

Assumptions:

1. WaterVision will provide two rounds of QAPP review at an estimated 6 hours per review (12 hours total).
2. WaterVision is not responsible for development, submittal, or approval of the QAPP document
3. The QAPP document is not a WaterVision deliverable

Deliverables:

- Two sets of comments on draft QAPP documents

Subtask 4D – Monitoring Equipment Installation, Set-up, and Testing

Establishing a well-functioning stormwater monitoring equipment shed is a major task. The task includes installation, set-up, and testing of several complex pieces of equipment. This task was not explicitly described as a task in the PWS. We understand that it is necessary and important, so we have created a subtask herein. If other arrangements have been made for establishing a well-functioning monitoring system, please disregard this subtask.

The monitoring equipment shed is likely to include the following components:

- Two auto-samplers with carousels of water sampling bottles;
- Pumps and tubing to bring water to the auto-samplers;
- Two flow meters to trigger sampling events;
- Two in-situ water quality meters (if needed); and
- One weather station (if needed).

Each of these components features a sensor, a data logger, and a power supply. In addition, the shed will need to be stocked with extra sets of sample bottles, preservative, spare parts, tools, health and safety gear, and maintenance equipment. It may also need to have a heat source to prevent samples and supplies from freezing.

WaterVision staff have experience setting up and running major stormwater monitoring programs. We are aware that field program expression; “anything that can go wrong, will go wrong” contains an element of truth, when it comes to long-term equipment deployment and data collection programs. As a result, we will take the time and effort necessary to conduct extensive equipment testing and troubleshooting and to establish fail-safe protocols for each piece of equipment at the beginning of the monitoring program.

Assumptions:

1. For conduit or insulated tubing runs to the upstream and downstream sampling points, the shed will be located no more than a 100’ total distance from the sample points (for example 50’ from the upstream sampling point as well as 50’ from the downstream sampling point).
2. WaterVision will not be responsible for the equipment shed or its contents.
3. WaterVision will not be responsible for municipality or other stakeholder staff who may enter or use the equipment shed.
4. WaterVision will not be responsible for the security of the equipment shed or for any loss or damage to the monitoring equipment therein.
5. WaterVision will not be responsible for the maintenance, troubleshooting, or repair of monitoring equipment.
6. WaterVision will not be responsible for providing sampling containers or preservatives. These materials will be provided by the analytical laboratory.
7. This subtask assumes one BMP site only.

Deliverables:

- Documentation related to monitoring equipment and sampling protocols will be provided as part of Subtask 4E below.

Subtask 4E – Monitoring Equipment and Sampling Protocol Training

Once the monitoring equipment shed has been installed and tested, WaterVision will develop training materials and provide training to the municipality and the NERL Team. Training materials will include checklists for tasks to be conducted when checking equipment, when preparing for a sampling event, and when conducting a sampling event. Training materials will also include simple “fact sheet”-type summaries of each key piece of equipment and its components.

WaterVision staff will conduct 7 site visits as part of the training program. We will conduct 2 training sessions prior to the first sampling event; one visit to orient the team regarding the equipment and its functionality and a second visit to conduct a “practice run” of the data collection process. We will also attempt to be present to support the municipality and/or NERL Team in conducting the first 5 sampling events.

Assumptions:

1. WaterVision will create a file and/or binder in the equipment shed containing equipment operating manuals, the monitoring plan, the QAPP, and other pertinent information related to the monitoring program.
2. WaterVision will not be responsible to scheduling or conducting sampling events.
3. WaterVision will not be responsible for data collection or analysis associated with the monitoring program.
4. This subtask assumes one BMP site only.

Deliverables:

- Simple “to-do” protocol lists for (1) maintenance checks, (2) pre-sampling event prep, and (3) sampling events.
- One-page, fact sheet-type basic functionality guides for each key piece of equipment

Contingency Tasks

The following four contingency tasks are briefly described below:

- Contingency 4A: Purchase of two auto-samplers
- Contingency 4B: Purchase of one in-situ water quality meter
- Contingency 4C: Purchase of equipment shed with electrical service
- Contingency 4D: Purchase of a “data logger” lap-top computer for project data download

4A: Purchase of two auto-samplers

The ISCO brand auto-sampler has been selected for this contingency. The ISCO 6712 sampler system provides seamless connection between multiple elements including flow meters, water quality instruments and pumps. More information may be found at <http://www.isco.com/products/products3.asp?PL=201101010>

The total cost estimate of one ISCO brand auto-sampler set up for flow-triggered sampling is \$14,036 and the cost estimate for two auto samplers would be \$24,755. The cost savings between the purchase of 2 instruments is that only one software license would be needed. The cost estimate provided herein is for the purchase of the item specified and does not include labor costs associated with assembling, setting up and testing the equipment (those costs are included as part of Subtask 4D)

4B: Purchase of one in-situ water quality meter

The YSI brand in-situ water quality meter has been selected for this contingency. The YSI system provides excellent reliability and customer service. The selected Sonde will be data logging, with optical dissolved oxygen, pH, conductivity, turbidity and temperature probes. Additional information may be found at www.ysi.com

The total cost estimate of one YSI brand water quality meter is \$18,125. The cost estimated provided herein is for the purchase of the item specified and does not include labor costs associated with assembling, setting up and testing the equipment (those costs are included as part of Subtask 4D).

4C: Purchase and installation of an equipment shed with electrical service

An appropriately designed and size shed has been selected for this contingency and the total cost estimate is \$7,595. For this contingency the cost estimate includes placement of the shed on-site, leveled and with footings (as needed). The cost estimate also includes the estimated cost of hiring an electrician subcontractor to provide electrical service with conduits or insulated tubing runs to the sample points. Please note that this is the cost for one shed and would be doubled, if sheds were needed for each of two sites.

4D – Purchase of a dedicated laptop computer for the monitoring equipment shed

A lap-top computer will be necessary to download data from the ISCO sampler, the YSI water quality instrument, and any other monitoring equipment. The laptop will serve as a data logger and can be used to conduct preliminary field data analysis. A basic windows-compatible PC will be purchased at an estimated cost of not more than \$800.

Task 5 – Operation & Maintenance (O&M) Plan

The team will develop a long-term O&M Plan for the BMPs installed to help ensure that they function as designed. The O&M Plans will be consistent with the Massachusetts Stormwater Standards. The plans will include identification of owners of the devices, identification of responsibility for operations and maintenance, a schedule of inspection and maintenance, a compilation of routine and non-routine maintenance tasks, and a simple map showing locations of facilities.

Deliverables:

- Draft Operation and Maintenance Plan(s)
- Final Operation and Maintenance Plan(s)

Task 6 – Education and Outreach

Education and outreach to further enhance the public's understanding of stormwater impacts and the benefits of the Cape Cod nitrogen-removal BMP(s) will be focused on the design of appropriate signage for permanent installation at the project site(s). Working with the project team, WaterVision will coordinate with the EPA design team on conceptual design for signs to be placed at each site. The signage will include general information on stormwater, a description of the specific BMP, a cross-sectional schematic of the BMP, environmental benefits of the BMP, and photographs of the site before construction. Signage details including language, logos, format, font, color, and location will be discussed with the project team. A sign currently being installed at the Mashapoag Pond, Providence, Rhode Island restoration site will be presented to the project team and used as a starting point for discussions.

Optional Tasks

As requested, we have developed an optional task cost estimate for creating a two-page brochure. The brochure task assumes that we will provide a PDF or other electronic deliverable and will not print paper copies. We have also developed an optional task cost estimate to develop a presentation (e.g., in Powerpoint) and provide a presentation to a Town.

Assumptions:

1. One kiosk including a sign, similar to the Mashapoag Pond BMP sign, will be installed at each of two sites.
2. Each kiosk sign will be 48" by 36" with an aluminum pedestal base.
3. WaterVision will provide source materials, including the BMP design and site photographs to the EPA design team.
4. WaterVision will not design the sign content. The design for the sign will be developed by the EPA design team and sent to WaterVision.

Deliverables:

- One kiosk at each of two sites.

Schedule

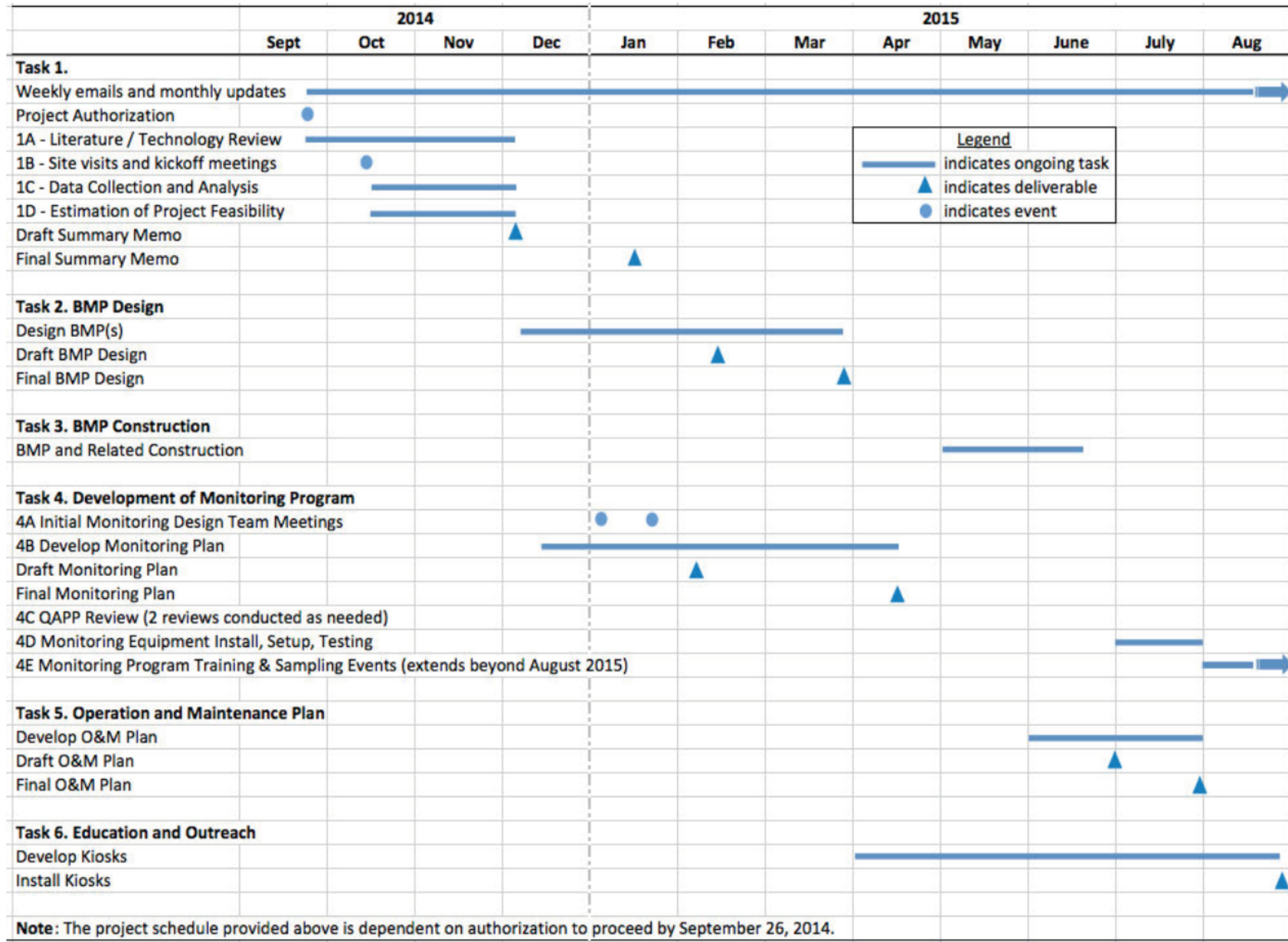
We respectfully submit a revised project schedule for your consideration. A schematic project timeline is provided in Figure 1 to support visualization of the project work flow and schedule.

Table 1. Suggested Project Schedule

Task and Deliverable	Date	Week #
Project Authorization	<i>September 26, 2014</i>	0
Weekly update emails and monthly progress updates		
<u>Task 1.</u>		
Site visits & kick-off meetings	October 10, 2014	2
Draft Summary Memo	December 5, 2015	10
Final Summary Memo	January 16, 2015	16
<u>Task 2. BMP Construction</u>		
Draft BMP full design	February 13, 2015	20
Final BMP full design	March 27, 2015	26
<u>Task 3. BMP Construction</u>		
Construction Begins	May 1, 2015	31
Construction Complete	June 19, 2015	38
<u>Task 4. Development of Monitoring Plan</u>		
Conduct initial mon. design meetings	January 5 & 24, 2015	14 - 17
Draft Monitoring Plan	February 6, 2015	19
Final Monitoring Plan	April 17, 2015	29
<u>Task 5, O&M Plans</u>		
Draft O&M Plans	June 12, 2015	37
Final O&M Plans	July 24, 2014	43
<u>Task 6. Education and Outreach</u>		
Install Kiosks	August 28, 2015	48

Note: "Project Week #" is incremental from date of authorization.

Figure 1. Cape Cod Nitrogen BMP Project Timeline



Cost Estimate

The total cost estimate for Tasks 1 through 6 including subtasks and contingencies, as described in the PWS and above, is provided in the attached tables.

In reviewing project cost estimates, please note that optional and contingency costs located to the right of the total cost estimate column are not included in the tallied in the total cost estimate for the task.

Table 1. Cape Cod Nitrogen BMP Project Cost Estimate

WaterVision Cost Estimate for Cape Cod N BMP September 15, 2014		Task 1A Literature/ Technology Review		Task 1B Site Visits		Task 1C Data Collection and Analysis		Task 1D Contractor Estimation of Project Feasibility		Task 1E Project Administration		Task 1 Total Cost Estimate	
WaterVision													
Labor Category	Rate	Hours	Total Cost	Hours	Total Cost	Hours	Total Cost	Hours	Total Cost	Hours	Total Cost	Hours	Total Cost
Project Sci./Eng 3	\$												
Project Sci./Eng 2	\$												
Project Sci./Eng 1	\$												
Project Assistant	\$												
Total WaterVision Labor													
Subcontractor: CEI													
Labor Category													
Eng/Sci IV, V	\$												
Eng/Sci III	\$												
Eng/Sci II	\$												
Eng/Sci I	\$												
Total CEI Labor Budget													
ODCs													
Construction, including t													
Travel-related													
Publication (print and co													
Total ODCs													
Total Budgeted Cost													

Table 1. Cape Cod Nitrogen BMP Project Cost Estimate (continued)

WaterVision Cost Estimate for Cape Cod N BMP September 15, 2014		Task 2A BMP Design Chatham		Task 2B BMP Design Barnstable		Task 2 Total Cost Estimate	
WaterVision							
Labor Category	Rate	Hours	Total Cost	Hours	Total Cost	Hours	Total Cost
Project Sci./Eng 3	\$	(b) (4)					
Project Sci/Eng 2	\$						
Project Sci/Eng 1	\$						
Project Assistant	\$						
Total WaterVision Labor Bu							
Subcontractor: CEI							
Labor Category							
Eng/Sci IV, V	\$						
Eng/Sci III	\$						
Eng/Sci II	\$						
Eng/Sci I	\$						
Total CEI Labor Budget							
ODCs							
Topo. Survey							
Travel							
Publication (print and copy)							
Total ODCs							
Total Budgeted Cost							

September 15, 2014

Table 1. Cape Cod Nitrogen BMP Project Cost Estimate (continued)

WaterVision Cost Estimate for Cape Cod N BMP September 15, 2014		Task 3A Construction Chatham		Task 3B Construction Barnstable		Task 3 Total Cost Estimate		Task 3 Additional Contingencies at Chatham	
WaterVision									
Labor Category	Rate	Hours	Total Cost	Hours	Total Cost	Hours	Total Cost	Hours	Total Cost
Project Sci./Eng 3	\$	(b) (4)							
Total WaterVision Labor Budget									
Subcontractor: CEI									
Labor Category									
Eng/Sci IV, V	\$								
Eng/Sci III	\$								
Eng/Sci II	\$								
Eng/Sci I	\$								
Total CEI Labor Budget									
ODCs									
BMP Labor									
BMP Materials									
BMP Equipment									
Travel assumes 8 or 4 week construc									
Site clearing and grubbing									
Deeper structure									
Deep structure installation and protec									
Contingency (40%)									
Construction dewatering and CPG co									
Invasives disposal									
Police Details									
Total ODCs									
Total Budgeted Cost									

September 15, 2014

Table 1. Cape Cod Nitrogen BMP Project Cost Estimate (continued)

WaterVision Cost Estimate for Cape Cod N BMP September 15, 2014		Task 4A Initial Monitoring Design Team Meetings		Task 4B and 4C Monitoring Plan & QAPP Review		Task 4D Monitoring Equip. Install, Setup and Testing		Task 4E Monitoring Equip. & Event Training		Task 4 Total Cost Estimate Excluding Opt Cont.		Task 4 Opt. Contingency Equipment Purchase Items	
WaterVision													
Labor Category	Rate	Hours	Total Cost	Hours	Total Cost	Hours	Total Cost	Hours	Total Cost	Hours	Total Cost	Hours	Total Cost
Project Sci./Eng 3	\$	(b) (4)											
Project Sci/Eng 2	\$												
Project Sci/Eng 1	\$												
Project Assistant	\$												
Total WaterVision Labor Bu													
ODCs													
Travel													
4A Two auto-samplers													
4B One in-situ water quality													
4C one equipment shed (in													
4D One laptop computer (f													
Total ODCs													
Total Budgeted Cost													

WaterVision Cost Estimate for Cape Cod N BMP September 15, 2014		Task 5A O&M Chatham		Task 5B O&M Barnstable		Task 6 Kiosk for Two Sites (two kiosks total)		Task 5 and 6 Total Cost Estimate Excluding Optional		Task 6 Optional Task Public Educational Brochure		Task 6 Optional Task Presentation at a meeting in Town	
WaterVision		Hours	Total Cost	Hours	Total Cost	Hours	Total Cost	Hours	Total Cost	Hours	Total Cost	Hours	Total Cost
Project Sci./Eng 3	\$												
Project Sci/Eng 2	\$												
Project Sci/Eng 1	\$												
Project Assistant	\$												
Total WaterVision Labor													
Subcontractor: CEI													
Labor Category													
Eng/Sci IV, V	\$												
Eng/Sci III	\$												
Eng/Sci II	\$												
Eng/Sci I	\$												
Total CEI Labor Budget													
ODCs													
Travel													
Kiosk and installation materials													
Publication (print and copy)													
Total ODCs													
Total Budgeted Cost													
September 15, 2014													